

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Paul E. Share, et al.	Customer No.	62127
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Title:	Container Having Barrier Properties and Method of Manufacturing the Same	Examiner:	Monica Anne Huson
		Docket No.:	06-1694-0101

RESPONSE AFTER FINAL

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/Aimee Stevens/
AIMEE STEVENS

INTRODUCTION

This is in response to the Final Office Action mailed on September 22, 2011. A **Petition For a One-Month Extension of Time** is filed herewith.

Listing of the Claims begins on page 2.

Remarks begin on page 8.

LISTING OF THE CLAIMS

The status of the claims is as follows:

1. (previously presented) A method, comprising:
 - (a) forming a preblend comprising:
 - (i) a diluent polyester,
 - (ii) a polyamide material, wherein the polyamide material comprises a polymer containing m-xylylenediamine monomer units, p-xylylenediamine monomer units, or a mixture thereof, and
 - (iii) cobalt or a complex or salt thereof present in the preblend in an amount of 20 to 2,000 parts per million, by weight;
 - (b) providing a base polyester;
 - (c) introducing the preblend of step (a) and the base polyester of step (b) into a molding apparatus to permit melting and admixing of the preblend and the base polyester;
 - (d) injection molding or extruding the admixture of step (c) in the apparatus to provide a preform; and
 - (e) expanding the preform of step (d) to provide a plastic container having a barrier layer formed from the admixture of step (c);
 - (f) wherein the plastic container is stable during unfilled storage and the barrier layer has an oxygen scavenging property that is activated after filling the container with an aqueous fluid, and wherein activation results from filling.
2. (original) The method of claim 1 wherein the plastic container is a multilayer plastic container.
3. (original) The method of claim 1 wherein the plastic container is a monolayer plastic container.
4. (cancelled)

5. (previously presented) The method of claim 1 wherein the preblend of step (a) has a greater stability after storage for six months at 25°C and 40% relative humidity than a blend containing only a polyamide material and an oxygen scavenging material stored under identical storage conditions.

6. (original) The method of claim 1 wherein the preblend is in a form of solid particles.

7. (original) The method of claim 1 wherein the diluent polyester is present in the preblend in an amount of about 25% to about 75%, by weight of the preblend.

8. (original) The method of claim 1 wherein the diluent polyester comprises a homopolymer or a copolymer of a polyethylene terephthalate, a polyethylene naphthalate, a polybutylene terephthalate, a cyclohexane dimethanol/polyethylene terephthalate copolymer, or a mixture thereof.

9. (previously presented) The method of claim 7 wherein the base polyester is a virgin bottle grade polyester and the admixture of step (c) consists essentially of the base polyester and the preblend.

10. (original) The method of claim 1 wherein the polyamide material is present in the preblend in an amount of about 25% to about 75%, by weight of the preblend.

11. (cancelled)

12. (previously presented) The method of claim 1 wherein the polyamide material comprises a polymerization product of m-xylyenediamine and adipic acid.

13-15. (cancelled)

16. (previously presented) The method of claim 1 wherein the preblend comprises about 30% to about 70%, by weight, of the diluent polyester comprising a polyethylene terephthalate, a polyethylene naphthalate, or a mixture thereof; about 30% to about 70%, by weight, of the polyamide material; and about 50 to about 1500 ppm, by weight, of a salt or a complex of cobalt.

17. (original) The method of claim 1 wherein the base polyester is in a form of solid particles.

18. (previously presented) The method of claim 9 wherein the preblend and the base polyester are admixed in an amount of about 0.5% to about 20%, by weight, of the preblend, and about 80% to about 99.5%, by weight, of the base polyester.

19. (previously presented) The method of claim 9 wherein the base polyester is selected from the group consisting of a polyethylene terephthalate, a polynaphthalene terephthalate, a polybutylene terephthalate, a cyclohexane dimethanol/polyethylene terephthalate copolymer, or a mixture thereof.

20. (previously presented) The method of claim 1 wherein the base polyester comprises a virgin bottle grade polyethylene terephthalate, a post consumer grade polyethylene terephthalate, or a mixture thereof.

21. (previously presented) The method of claim 1 wherein the preform contains about 10 to about 80 ppm, by weight, of cobalt or a salt or complex thereof.

22-24. (cancelled)

25. (previously presented) The method of claim 1, further comprising:
activating the oxygen scavenging property of the barrier layer by filling the plastic container with the aqueous fluid.

26. (previously presented) The method of claim 1, wherein the plastic container has an oxygen permeability of 0.035 cc O₂/package/day or less after filling with water for 48 hours.

27. (previously presented) A method, comprising:

- (a) forming a preblend comprising:
 - (i) a diluent polyester,
 - (ii) a polyamide material, wherein the polyamide material comprises a polymer containing m-xylylenediamine monomer units, p-xylylenediamine monomer units, or a mixture thereof, and
 - (iii) cobalt or a complex or salt thereof;
- (b) providing a base polyester consisting essentially of a virgin bottle grade polyester;
- (c) introducing the preblend of step (a) and the base polyester of step (b) into a molding apparatus to permit melting and admixing of the preblend and the base polyester to form an admixture;
- (d) injection molding or extruding the admixture of step (c) in the apparatus to provide a preform; and
- (e) expanding the preform of step (d) to provide a plastic container having a barrier layer formed from the admixture of step (c);
- (f) wherein the plastic container has an oxygen permeability in cc O₂/package/day after filling with water for 48 hours, that is less than the oxygen permeability of the container prior to filling with water, and wherein activation of oxygen-scavenging results from filling.

28. (previously presented) The method of claim 27, wherein the preblend comprises:
about 30% to about 70%, by weight, of the diluent polyester comprising a polyethylene terephthalate, a polyethylene naphthalate, or a mixture thereof;
about 30% to about 70%, by weight, of the polyamide material comprising the polyamide material; and
about 50 to about 1500 ppm, by weight, of cobalt or a complex or a salt thereof.

29. (previously presented) The method of claim 9, wherein the preblend comprises:
about 30% to about 70%, by weight, of the diluent polyester;
about 30% to about 70%, by weight, of the polyamide material; and
about 50 to about 1500 ppm, by weight, of cobalt or a complex or salt thereof.

30. (previously presented) The method of claim 9, wherein the base polyester is a virgin bottle grade polyethylene terephthalate.

31. (previously presented) A method, comprising:
filling a monolayer plastic container with an aqueous product to activate an oxygen scavenging property of the plastic container, wherein the container has been produced by a process comprising:
(a) forming a preblend comprising:
(i) a diluent polyester,
(ii) a polyamide material comprising a polymer containing m-xylylenediamine monomer units, p-xylylenediamine monomer units, or a mixture thereof, and
(iii) cobalt or a complex or salt thereof;
(b) providing a base polyester;
(c) introducing the preblend of step (a) and the base polyester of step (b) into a molding apparatus to permit melting and admixing of the preblend and the base polyester;
(d) injection molding or extruding the admixture of step (c) in the apparatus to provide a monolayer preform; and
(e) expanding the monolayer preform of step (d) to provide a monolayer plastic container having a barrier layer formed from the admixture of step (c).

32. (previously presented) The method of claim 31, wherein the preblend comprises:
about 30% to about 70%, by weight, of the diluent polyester comprising a polyethylene terephthalate, a polyethylene naphthalate, or a mixture thereof;
about 30% to about 70%, by weight, of the polyamide material; and
about 50 to about 1500 ppm, by weight, of cobalt or a complex or a salt thereof.

33. (previously presented) The method of claim 9, wherein the cobalt or a salt or complex thereof is present in the preblend in an amount of about 100 to about 1,000 parts per million, by weight of the preblend.

REMARKS

In the Final Office Action mailed on September 22, 2011, claims 1-3, 5-10, 12, 16-21, and 25-33 stand rejected.

Interview Summary

Applicant's undersigned representative, Andrew DeMaster, appreciates the Examiner's time spent discussing the above-identified application on January 9, 2012. Grant Schutte, Valspar's Technical Director for Barrier, also participated in the telephonic interview. The teachings of both U.S. 5,744,056 ("Venkateshwaran") and U.S. 5,759,653 ("Collette") were discussed in view of the pending claims. No agreement was reached on the allowability of the pending claims.

35 U.S.C. 103(a) Rejections

Claims 1-3, 5-10, 12, 16-21, and 25-33 stand rejected as being obvious over Venkateshwaran (US 5,744,056) in view of Collette (US 5,759,653).

Venkateshwaran teaches an oxygen-scavenging composition in which oxygen scavenging is accomplished through use of a special blend of an oxidizable metal component (preferably iron) in combination with an electrolyte component (preferably sodium chloride) and a solid, non-electrolytic acidifying component (preferably sodium acid pyrophosphate).¹ The iron, or "oxidizable metal component," of the Venkateshwaran composition is the actual material that reacts with and scavenges oxygen, with the electrolyte and the non-electrolytic acidifying components promoting the reaction.² Since iron is the material that scavenges oxygen, the Venkateshwaran composition includes large amounts of iron to provide a meaningful oxygen-scavenging capacity that is not prematurely depleted. Thus, for example, the polyethylene-based oxygen-scavenging concentrate of Example 2 of Venkateshwaran includes 20% by weight of iron as the oxidizable metal component, which corresponds to over 200,000 parts per million ("ppm") of iron.³

¹ See, e.g., Venkateshwaran at col. 3, lines 31-34.

² See, e.g., Venkateshwaran at col. 4, lines 55-60; and col. 1, lines 40-41.

³ The Example 2 concentrate is prepared using a 4:3:2:1 weight ratio of iron:sodium chloride:betonite clay:anhydrous sodium acid pyrophosphate mixed in 50:50 weight ratio with polyethylene granules. Pursuant to these ingredient amounts, the oxygen-scavenging concentrate of Example 2 includes 20% by weight of iron, which corresponds to over 200,000 ppm of iron.

Notably, Venkateshwaran fails to disclose any of the following features:

- the use of a cobalt in any capacity, let alone as a catalyst to promote the scavenging of oxygen by an oxygen-scavenging polymer;
- the use of any oxygen-scavenging polymer, let alone an oxygen-scavenging polyamide material such as a polymer containing m-xylylenediamine monomer units, p-xylylenediamine monomer units, or a mixture thereof;
- a preblend that includes both polyamide and polyester.⁴

As already discussed by Applicants on the record,⁵ the secondary Collette reference teaches a multilayer container that includes an oxygen-scavenging layer that is already activated prior to filling the container with product and, moreover, does not teach a preblend that includes cobalt or a complex or salt thereof present in the preblend in an amount of 20 to 2,000 part per million. The materials and mechanism by which the Collette oxygen-scavenging layer scavenges oxygen is completely different than that of Venkateshwaran. Unlike Venkateshwaran, Collette teaches the use of a metal catalyst (such as, e.g., a cobalt catalyst) in combination with an oxygen-scavenging polymer (such as, e.g., MXD-6 polyamide) to promote the scavenging of oxygen by the polymer.⁶

The Office Action, however, asserts that the instantly claimed invention would have been *prima facie* obvious over Venkateshwaran in view of Collette. In particular, the Office Action argues that it would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to: (a) use Colette's specific polyamide and cobalt in Venkateshwaran's composition and (b) to use any appropriate ingredient percentages in the modified composition. In support of the rejection, the Office Action at page 5 asserts that "substituting equivalents known for the same purpose (e.g., iron or cobalt for oxygen scavenging) is obvious (MPEP 2144.04 (II))". The Office Action at page 6 further asserts that "it is interpreted that since

⁴ While Venkateshwaran discloses each of polyamide and polyester in a long list of potentially suitable thermoplastic polymers at col. 6, lines 37-60, Venkateshwaran does not disclose a single preblend (or "concentrate") that includes either a polyester or a polyamide, let alone both. In fact, all of the preblends exemplified by Venkateshwaran (see the Examples) include polyethylene as the lone thermoplastic polymer in the concentrate.

⁵ See, for example, pages 8-9 of Applicant's Amendment After Final dated September 21, 2010; pages 11-13 of Applicant's Amendment dated February 2, 2011; and the Declaration of inventor Paul Sharpe dated October 20, 2009.

⁶ See, e.g., col. 10, lines 23-30.

Collette discloses use of either iron or cobalt, and Venkateshwaran discloses the use of iron, either iron or cobalt would both function in the appropriate fashion to promote scavenging of oxygen in the combined composition.” Applicants respectfully traverse the obviousness rejection.

As a threshold matter, it is respectfully submitted that the rejection is based on a flawed premise. While Collette discloses that iron or cobalt may each function as a catalyst to promote the scavenging of oxygen by an oxygen-scavenging polymer, this disclosure of catalytic activity in Collette in no way suggests that cobalt is capable of functioning as the actual oxygen scavenger. Nowhere does Collette teach or suggest that cobalt is capable of scavenging oxygen. Moreover, cobalt is conspicuously absent from the list of oxidizable metals that Venkateshwaran teaches are capable of reacting with and scavenging oxygen when used in conjunction with an electrolyte and non-electrolytic, acidifying component.⁷ In fact, Applicants are not aware of any teachings in the prior art that disclose that cobalt is capable of functioning as an oxygen scavenger that reacts with and scavenging oxygen. A skilled artisan considering Collette and Venkateshwaran would have no reason to believe that cobalt would be suitable for use in place of iron in the Venketeshwaran composition as the actual material that reacts with and scavenges oxygen.

It is further respectfully submitted that the proposed modification of the Venkateshwaran composition to include both a cobalt catalyst and an oxygen-scavenging polyamide polymer in place of iron and a non-oxygen scavenging polyamide polymer is improper because it would change the principle of operation of the Venkateshwaran composition. MPEP 2143.01(VI) states that “[i]f the proposed modifications or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious.” As previously discussed, Collette teaches that transition metals such as cobalt or iron function as catalysts for promoting the scavenging of oxygen by an oxygen-scavenging polymer. In contrast, the Venkateshwaran composition utilizes a completely different mechanism for scavenging oxygen. The oxidizable metal component of Venkateshwaran (preferably iron) does not function as a catalyst to promote the scavenging of

⁷ See Venkateshwaran at col. 4, lines 40-54.

oxygen by another material, but rather is the actual material that reacts with and scavenges oxygen. Therefore, the proposed modification of Venkateshwaran in view of Collette would completely change the mechanism by which the Venkateshwaran composition scavenges oxygen and would, thus, change the principle of operation of the Venkateshwaran oxygen-scavenging composition. Accordingly, it is respectfully submitted that the asserted obviousness rejection is improper under MPEP 2143(VI).

In addition, it is respectfully submitted that each of Venkateshwaran and Collette teach against the proposed modification. Venkateshwaran explicitly desires a packaging structure having an oxygen-scavenging effect that is substantially inactive prior to use of the packaging structure⁸, whereas Collette desires the opposite and teaches methods and materials for producing a plastic container having an oxygen-scavenging layer that is already activated prior to use. Accordingly, based on the explicit teachings of Collette and Venkateshwaran, a skilled artisan would not look to modify the Venkateshwaran composition to include the metal catalyst and oxygen-scavenging polyamide polymer of the Collette reference. Based on the teachings of Collette, a skilled artisan would question whether the Venkateshwaran composition modified to include a cobalt catalyst and oxygen-scavenging polyamide polymer of Collette would prematurely activate prior to use, which would be contrary to the express teachings of Venkateshwaran.

⁸ See, e.g., Venkateshwaran at col. 11, line 59 through col. 12, line 5.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all of pending claims 1-3, 5-10, 12, 16-21, and 25-33 are in condition for allowance. Reconsideration and prompt allowance of all pending claims is respectfully requested.

Payment for a one-month extension of time is submitted herewith. The Commissioner is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 50-2070.

Respectfully submitted,

VALSPAR SOURCING, INC.

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By: /Andrew A. DeMaster/
Andrew A. DeMaster, Reg. No. 57326
PO Box 1461
Minneapolis, MN 55440-1461
Telephone: (612) 851-7281
Fax: (612) 486-7979